

Amendments to the Drawings:

The attached drawing sheet includes changes to Fig. 1. This sheet, which includes Figs. 1 and 2, replaces the original sheet including Figs. 1 and 2. In Fig. 1, elements 16 and 20 are now drawn as boxes. No new matter has been added.

Attachment: Replacement Sheet

REMARKS

Applicants respectfully traverse and request reconsideration.

FIG. 1 has been objected to due to an informality. A replacement FIG. 1 is provided herewith.

Claims 1, 2 and 5-13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,275,685 (Wessel et al.) in view of U.S. Patent No. 5,867,065 (Leyendecker) in further view of U.S. Patent No. 5,963,091 (Chen et al.).

According to the claims, an error signal is determined, depending on a transmission signal and a previously-registered transfer characteristic. The error signal is subjected to a temporal extension, i.e. a time expansion, such that an error signal segment in the frequency spectrum of a transmission signal transmitted by the non-linear transmission path is shifted away from the useful frequency range of the signal. A time-dispersive element is used for effecting the time expansion of the error signal, wherein coefficients of the time-dispersive element are determined in advance from the transfer characteristic of the non-linear transmission path, such that the shifting of the error signal segment is obtained (see page 15, lines 7 to 19 of the present application, for example).

The prior art cited in the subject office action is clearly silent about the approach of effecting a temporal extension of an error signal (representing an estimate of an error generated due to a non-linearity of a power amplifier), such that error signal segments in the frequency spectrum of a transmission signal transmitted by the power amplifier are shifted away from the useful frequency range of the transmission signal.

Wessel (US 6,275,685 B1) relates to a linear amplifier arrangement as shown in figs. 4 and 7 thereof. An adaptive pre-distorter 70 generates a gain-correction signal 92 and a phase

correction signal 94 based on an input from an envelope detector 34 and based on correction values stored in a phase correction RAM 710 and in a gain-correction RAM 740 (see column 8, lines 17 to 32 of Wessel). The digital correction values are output on data busses 713, 743 and converted to analog correction signals 92 and 94 via DACs 712, 742 and anti-aliasing filters 714 and 744. The input signal is modulated by modulators 16 and 18 (see Fig. 4 of Wessel), making use of the analog correction signals 92 and 94. The gain and phase error detectors 60 shown in Fig. 4 of Wessel generate a gain error signal 82 and a phase error signal 84, which are used for adapting the correction signals stored in the RAMs 710 and 740 (see the paragraph bridging columns 8 and 9 of Wessel).

The office action considers the adaptive pre-distorter as being a time-dispersive element according to the invention. For example, in section 6 of the office action, the filter 714 is regarded as being a time-dispersive element having a functionality as it is defined in the independent claims of the present application. This assessment is respectfully traversed.

The filter 714 represents an anti-alias filter (see column 8, lines 12 and 16 of Wessel) downstream of an digital-to-analog converter and is provided in order to counteract any unintentional effects caused by the digital-to-analog converter. Thus, the phase correction signal 94 output by the anti-alias filter 714 represents an analog version of the digital value output from the RAM 710 and, for the rest, corresponds to the digital value output from the RAM 710.

Accordingly, the filter 714 is not adapted to obtain such a temporal extension of an error signal that an error signal segment in the frequency spectrum of a transmission signal transmitted by the non-linear transmission path is shifted away from the useful frequency range of the signal. Accordingly, the anti-alias filter 714 does not represent a time-dispersive element as defined in the independent claims of the present application.

Accordingly, Wessel does not prejudice the patentability of the independent claims of the present application.

Moreover, the office action refers to Chen (US 5,963,091) and, in particular, to column 4, lines 32 to 41 thereof to show that shifting a frequency spectrum has been known in the art. This text portion relates to a digital signal processor comprising a down converter circuit for down-converting the frequency of received signals into the base-band frequency range. In other words, the high-frequency signals V_n , V_d and V_o are mixed with signals having an appropriate frequency, such that the center frequency of the signals V_n , V_d and V_o is shifted to 0.

The allegation that a person skilled in the art would combine the teachings of Wessel and Chen is respectfully traversed. The down converter of Chen is for shifting the frequency range of signals into the base-band frequency range, while the filter 714 represents an anti-alias filter. There is not any reason as to why a person skilled in the art should replace the anti-alias filter 714 of Wessel by the down converter of Chen due to the completely different functionalities of these elements. Thus, a person skilled in the art would not have taken into consideration a combination of Wessel and Chen in the manner alleged in the office action.

Moreover, for the sake of argument, if a person skilled in the art would take a combination of Wessel and Chen into consideration, he would not obtain what is claimed in the present application. Rather, the down-conversion taught by Chen clearly has nothing to do with shifting an error signal segment away from a useful frequency range, as defined in the independent claims of the present invention. Thus, even if a person skilled in the art would take a combination of Wessel and Chen into consideration, which is respectfully denied, he would not obtain what is claimed in the present application.

The same is true for the subject matter of claim 10 of the present application.

In the paragraph bridging pages 6 and 7 of the office action, the U.S. Examiner feels that the filter 714 represents a band-pass filter succeeding a power amplifier. The filter 714 is provided within the adaptive pre-distorter 70 in the signal path from the RAM 710 to the modulator 18. Thus, the band-pass filter is clearly preceding the power amplifier.

It has been shown above that Wessel or a combination of Wessel and Chen are silent about effecting a temporal extension of an error signal (representing an estimate of an error generated due to a non-linearity of the power amplifier), such that due to the temporal extension of the error signal, an error signal segment in the frequency spectrum of a transmission signal transmitted by the power amplifier is shifted away from the useful frequency range of the transmission signal. Thus, the prior art does also not prejudice the patentability of the subject matter of claims 11 and 12.

The office action alleges on page 8, lines 12 to 16 that according to Wessel, the shifting of an error signal segment in the frequency spectrum of a transmission signal is effected due to a temporal extension of the error signal and he refers to column 5, lines 53 to 60 of Wessel. This assessment is respectfully traversed. According to Wessel, linearization of the amplitude and phase-distortions shown in Figs. 1a and 1b thereof are obtained by the coefficients stored in the RAMs 710 and 740. The filters 714 and 744 represent anti-alias filters and, therefore, are provided in order to counteract any unintentional effects caused by the digital-to-analog converters. The function of the filter 714 is to make sure that the output thereof represents a true analog version of the digital correction value output by the RAM 710. Thus, it is clear that any gain corrections and phase shifts according to Wessel are obtained due to the magnitude of the correction values stored in the RAMs, rather than due to any temporal extension caused by the filters 714 and 744. Accordingly, the claims are in condition for allowance.

Claims 3-4 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Wessel in view of Leyendecker in further view of Chen in further view of U.S. Patent No. 5,049,832 (Cavers). Applicants respectfully reassert the relevant remarks made above and as such, these claims are also believed to be allowable.

New dependent claims 14 to 17 have been added. According to preferred embodiments of the invention, parameters of the time-dispersive element are adjusted based on the transmission characteristic of the non-linear transmission path so that the time-dispersive element can provide for the effect of shifting the error signal segment away from the useful frequency range. To be more specific, according to preferred embodiments, the coefficients of the time-dispersive element (effecting the time expansion of the error signal) are determined in advance from the transfer characteristic of the non-linear transmission path (see page 12, lines 16 to 28 of the present application). Wessel is clearly silent about determining coefficients of the filters 714 and 744 in advance from the transfer characteristic of the power amplifier 22.

Applicants respectfully submit that the claims are in condition for allowance and that a timely Notice of Allowance be issued in this case. The Examiner is invited to contact the below-listed attorney if the Examiner believes that a telephone conference will advance the prosecution of this application.

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Respectfully submitted,

By: Christopher J. Reckamp
Christopher J. Reckamp
Registration No. 34,414

Vedder, Price, Kaufman & Kammholz, P.C.
222 N. LaSalle Street
Chicago, IL 60601
(312) 609-7500
FAX: (312) 609-5005